From Plans to Markets

China's Experiment in Building an Adaptation Economy

Technical paper

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About this Report

The Paulson Institute and Basilinna Advisory, in partnership with Morphosis, the Center for Sustainability Studies at Fundação Getulio Vargas (FGVces), and the Instituto Itaúsa have produced the following report on emerging climate adaptation markets in China.

Drawing on national policies, local pilot programs, and private sector participation, this paper offers an initial overview of China's experiments with adaptation finance. This case study seeks to explore how actors across government, financial institutions, and the real economy are beginning to define and address the adaptation challenge.

This report draws on examples and analysis from China that could help inform public and private stakeholders hoping to catalyze adaptation finance in their home markets. Our hope is it can contribute lessons and takeaways originating from China to the global adaptation finance discourse.

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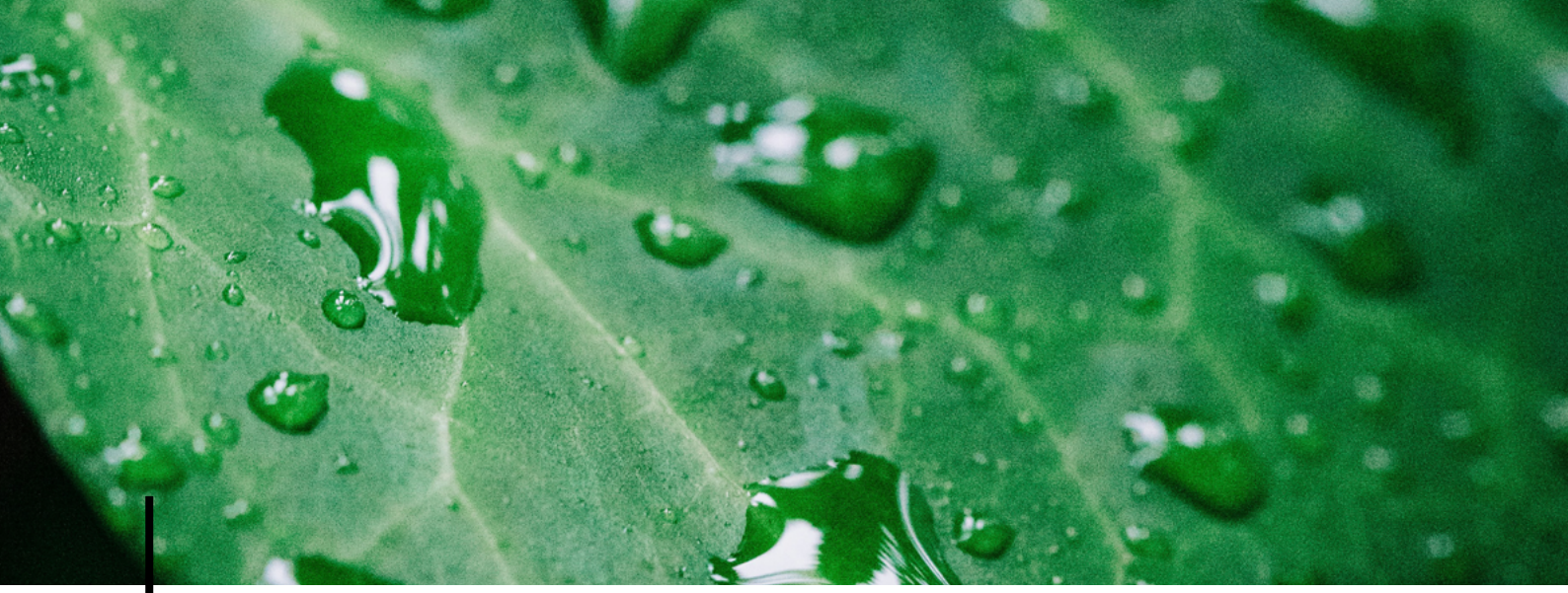


Executive Summary

China has begun integrating climate adaptation into its development strategy, setting ambitious central and provincial goals and positioning adaptation as both a shield against climate risks and a foundation for long-term economic resilience. The National Climate Change Adaptation Strategy 2035 broadens the scope of its 2013 predecessor, the country's first, explicitly promoting private sector participation in adaptation finance through instruments such as green bonds, bank loans, insurance reforms and financial innovations. The full version of the country's 15th Five-Year Plan (FYP), which is expected to be released in March 2026, will indicate the degree to which central planners will prioritize adaptation over the decisive next five years, as climate change and biodiversity loss grows increasingly disruptive. There are some signs of progress in the 14th Plan, which emphasized resilience in cities, agriculture, infrastructure and disaster prevention, as well as in local initiatives such as the city of Shenzhen's adaptation plan addressing health, water efficiency, and economic risks. China's experience highlights how early state support to de-risk private investment, deploy smart subsidies and integrate adaptation into industrial policy can support the growth of adaptation businesses. Over time, this policy-driven and experimental approach has the potential to yield lessons for other countries seeking to build adaptation markets and climate-resilient economies.

Introduction

China has been a comparatively early mover in setting ambitious and broad climate adaptation goals. Yet delivering on these ambitions will depend on building the foundations of an adaptation economy, one in which the provision of goods, services and technologies for a world beyond 1.5C can scale through viable markets. Adaptation assets (flood defenses, resilient cooling, climate-resilient seeds, insurance products) have cash-flow structures and risk-return profiles that are distinct from mitigation or conservation assets.

Adaptation requires not only government investment but also strategic adjustments and policies that foster innovation, stimulate demand and generate value especially in the nature economy. Chinese leaders recognize that climate change and biodiversity loss are not only risks to be mitigated but also forces that could help shape new markets and industrial pathways of opportunity. China is well positioned to leverage its long-term planning mechanisms and central coordination capacity to establish policy frameworks that nurture the emergence of adaptation markets. The challenge, of course, lies in the implementation.

The objective, therefore, is the creation of economic systems that make adaptation investable and profitable. Adaptation innovation unlocks solutions for living in a hotter, more volatile environment that can be traded, scaled and embedded in everyday life. Ice-based batteries[1], for instance, which freeze water overnight, and then use the stored ice to cool buildings during the day, are more than a technical invention; they represent a market response to rising temperatures, meeting consumer demand for cooling while simultaneously serving as a component of energy and infrastructure systems. Such products illustrate how adaptation transitions from a policy objective to an economic paradigm: hotter climates create enduring demand, and adaptation businesses arise to meet it.

China's central leadership has begun to embed this perspective into national development strategies, treating adaptation as both an avenue to economic resilience and a driver of new industries.[2] As President Xi Jinping said in his UN address in September, China's goal is to "basically create a climate adaptive society" by 2035. There is political will at the top, but it now must be turned into action.

One existent mechanism that could be directly levered for adaptation finance is China's Gross Ecosystem Product (GEP). By quantifying the economic value of resilient ecosystems, GEP could strengthen

1 Hackaday (2025). The Coolest Batteries You've Never Heard Of. https://hackaday.com/2025/03/09/the-coolest-batteries-youve-never-heard-of

2 Chinese Ministry of Foreign Affairs (2025). President Xi Jinping Delivers Video Remarks at the U.N. Climate Summit. https://www.fmprc.gov.cn/mfa_eng/xw/zyxw/202509/t20250925_11716513.html

the case for investing in nature-based adaptation. Locations that track GEP have set up special funds and received more green finance to support adaptation projects (restoring wetlands, forests and mangroves for hazard protection). GEP applications can show potential revenue streams that could help answer the 'who pays for adaptation' question. For example, if a city knows that protecting an upstream watershed yields X million yuan in flood prevention value (per GEP), it could justify paying a private operator or community to maintain that watershed.

Pilot projects are experimenting with incentives to stimulate private sector participation, while policymakers increasingly see climate risk and biodiversity loss as catalysts for industrial upgrading.[3] These pilots aim to create real-world testbeds for adaptation technologies and business models. If successful, they will be expanded nationwide.

Yet quantifying adaptation remains a challenge in China, as it does everywhere else. If China can take the lead in establishing an adaptation taxonomy and verification standards, it would gain a strong position in shaping international rules, much like it did when it pioneered the development of green classification standards. Such a taxonomy would not just mobilize finance but also send a clear government signal that adaptation is seen as an investable economic domain in its own right.

3 Shaanxi China.com (2024). Three areas in Shaanxi Province were selected as pilot cities for deepening climate-resilient urban construction (陕西3地入选深化气候适应型城市建设试点). https://shaanxi.china.com/m/news/20000876/20240516/25876440.html

China's Adaptation Journey: From Ambition to Implementation

Articulating a goal and achieving it are not the same thing. While China can mobilize resources and steer industries in a more top-down fashion than many other economies, even its leaders cannot simply decree the emergence of adaptation markets. Compounding the challenge is the fact that China's new energy sectors are primarily oriented toward the mitigation market, while industries directly related to adaptation (e.g. disaster-resilient infrastructure, climate-resilient cooling systems, agricultural drone services) are still at an early stage. The logic of adaptation markets is sound, though fundamentally distinct: cash flows mainly derive from avoided losses, cost savings and reduced insurance premiums, rather than from direct revenue streams.

According to the National Center for Climate Change Strategy and International Cooperation, China will require US$7.8 trillion between 2016 and 2030 to meet its Nationally Determined Contribution (NDC) goals, around US$510 billion annually. Adaptation alone accounts for US$222 billion of this total, leaving an estimated annual adaptation financing gap of US$111 billion.[4] The government alone cannot provide all the funding needed to close this gap; the private sector must be mobilized to make up the rest.

Still, adaptation markets in China remain nascent. National strategies, Five-Year Plans and pilot programs have begun to create policy recognition and early experiments, yet large-scale private capital has not followed. The central government's challenge is to design financial infrastructure and incentives that provide the right policy environment to shift adaptation toward a functioning market economy, as we have seen develop in climate mitigation.

China's National Climate Change Adaptation Strategy 2035 (released in 2022) represents an important step in this direction. Broader in scope than the country's first adaptation plan (2013), the strategy elevates adaptation to the same level as mitigation and emphasizes the need to mobilize private capital through diversified funding sources.[5] China's 14th Five-Year Plan (2021–2025) gave adaptation initial prominence by calling for enhanced resilience in agriculture, cities and infrastructure, along with vulnerability assessments in high-risk areas. It also

4 Chinese Ministry of Commerce. (2024). Financial support for infrastructure to enhance climate resilience (金融支持基础设施提升气候韧性).https://chinawto.mofcom.gov.cn/article/br/202411/20241103544388.shtml

5 Ministry of Ecology and Environment of China (2022). National Climate Change Adaptation Strategy 2035 (国家适应气候变化战略2035). https://www.gov.cn/zhengce/zhengceku/2022-06/14/5695555/files/9ce4e0a942f-f4000a8a68b84b2fd791b.pdf (Alias: https://perma.cc/G394-SZ8B)

highlighted concrete interventions such as coastal defenses, drought-resistant crops and disaster early warning systems.[6] Ideally, the 15th FYP will build upon these initial steps.

Local governments have begun to take action, as they are on the front line of the impact of adaptation challenges. Shenzhen released its own climate change adaptation plan in 2024, which links ventilation and water-use efficiency upgrades to public health and economic resilience, while explicitly identifying typhoon risks to growth.[7]

At the national level, Beijing is experimenting with mechanisms to bring banks, institutional investors and capital markets into adaptation. By using instruments such as loans, green bonds and insurance products, policymakers aim to help price climate risk and transfer it across the economy. These financial tools also create incentives for new technologies to be adopted. Agricultural drones provide a telling example: though initially promoted as green innovation rather than an adaptation solution, policy incentives accelerated their uptake, ultimately improving crop resilience to variable climates. The lesson is clear: well-targeted incentives and policies can open the door to viable adaptation solutions.

The progression from financial tools to technology adoption illustrates a broader lesson: when policies and incentives are well designed, they can open the door to viable adaptation solutions by aligning financial markets and resilience-based innovation.

However, not all models have succeeded. The Public–Private Partnership (PPP) approach was used for pilot projects of sponge cities—a nature-based solution designed to absorb excess water in flood-prone areas. The projects struggled when central grants covered only 20 percent of the required investment and local governments were unable to mobilize sufficient private finance to fill the gap. While there are cases where PPPs in China have worked, empirical studies show that overall, they have been less effective in attracting private capital compared with other countries, and the successes of PPP projects are heavily reliant on local fiscal affordability.[8] [9] Recognizing these challenges, recent studies, including work by the Asian Infrastructure Investment Bank (AIIB), have focused on how to improve PPP performance, emphasizing clearer risk-sharing arrangements and more predictable returns for private investors.[10]

China's Electric Vehicle (EV) sector offers a cautionary tale. Heavy subsidies and local enthusiasm spurred the creation of over 100 firms, generating consumer benefits and rapid deployment, but also overcapacity, weak firms and backlash abroad as excess supply was exported.[11] A similar boom-and-bust cycle could occur in adaptation technologies if policy signals create enthusiasm without sufficient

6 National People's Congress of China (2021). Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035 (中华人民共和国国民经济和社会发展第十四个五年规划和2035年远景目标纲要). http://www.gov.cn/xinwen/2021-03/13/content_5592681.html (Alias: https://perma.cc/73AK-BUW2)

7 Shenzhen Municipal Ecology and Environment Bureau. (2024). Shenzhen Climate Change Adaptation Plan (2023–2035) (深圳市适应气候变化规划 2023–2035 年).https://meeb.sz.gov.cn/attachment/1/1430/1430604/11209902.pdf

8 Tan J., Zhao Z. (2019). The Rise of Public–Private Partnerships in China: An Effective Financing Approach for Infrastructure Investment? https://www.researchgate.net/publication/332190420_The_Rise_of_Public-Private_Partnerships_in_China_An_Effective_Financing_Approach_for_Infrastructure_Investment

9 Li Z., Wang H. (2024). Institutional quality, economic development, and the sustainable outcomes of PPP projects: An empirical analysis of failed PPP projects in China from 2014 to 2020. https://pmc.ncbi.nlm.nih.gov/articles/PMC11133655/

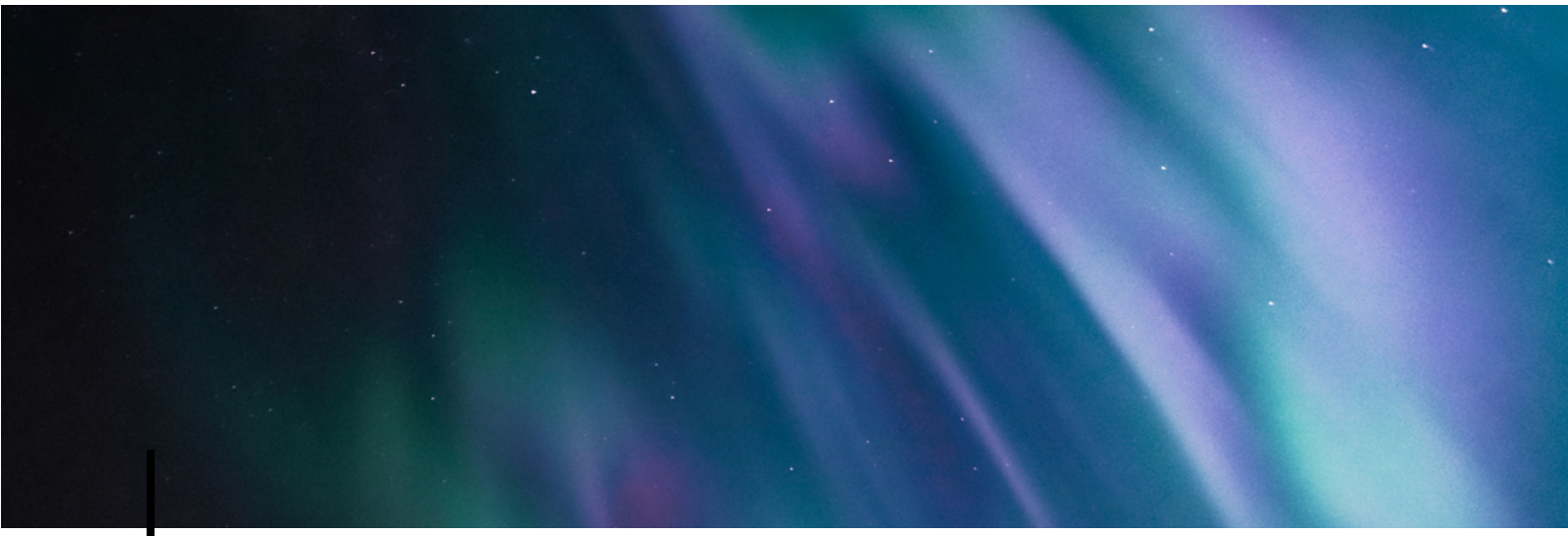
10 AIIB (2022). Moonshots for the Emerging World Asian Infrastructure Finance 2022: Building State Capacity and Mobilizing the Private Sector Toward Net Zero. Chapter 3: Enabling PPPs and the Private Sector for Net Zero https://www.aiib.org/en/news-events/asian-infrastructure-finance/_common/pdf/AIIB-Asian-Infrastructure-Finance-2022.pdf#page=38

11 CNN (2025). Chinese electric cars are going global. A cut-throat price war at home could kill off many of its brands. https://www.cnn.com/2025/09/26/cars/chinese-electric-cars-price-wars-intl-hnk-dst

attention to market structures, quality standards and long-term profitability.

Another challenge lies in bureaucratic roadblocks. Coordination across agencies in adaptation policymaking remains limited, underscoring persistent fragmentation: the Ministry of Ecology and Environment sets adaptation strategies, while the National Development and Reform Commission controls planning. Separately, the People's Bank of China regulates green finance. These silos lead to fragmented pilots that lack scaling pathways. At times, the various bureaucratic entities are competing not cooperating. Overall coordination at the central level across Ministries and throughout the provinces will be important to ensure consistent and appropriate policy adoption.

In China, as elsewhere, investors seek markets for adaptation goods and services that are clearly defined and profitable. This makes the state's role important: effective policy frameworks can accelerate the emergence of adaptation markets and unlock finance, while weak or fragmented approaches risk leaving adaptation underfunded and underdeveloped. This is in part due to the political risk of not aligning with top-level goals, which makes the private sector relatively responsive to central government enthusiasm.



Soaking Up State Support: Urban Adaptation Via China's Sponge Cities

China launched the national "sponge city" pilot program a decade ago. It was designed to address the country's escalating urban flooding problem: rapid urbanization led to the paving over of natural drainage systems, and more intense rainfall events linked to climate change compounded the risk. Today, around 60 percent of China's medium andlarge cities experience flooding each year.[12] Sponge cities aim to absorb and redirect excess precipitation through green spaces, underground reservoirs, canals and pumps, turning urban areas into systems that can both manage stormwater and improve water resilience.

12 NPR. (2023). 'Sponge cities' could be the answer to soaking up urban flooding. https://www.npr.org/2023/10/03/1202252103/china-floods-sponge-cities-climate-change

Making urban landscapes softer and greener has proven to be an effective response to increased rainfall. The central government's *Guidelines to Build Sponge Cities* set a 70 percent rainfall retention target and earmarked over US$200 million in government funds for the initiative. In fact, the project relies almost entirely on government funds. There are also municipal-level plans for sponge cities. For example, Beijing's program targets mountainous and flood (or landslide) prone areas within a city, but the cost is heavily borne by the local government itself.

Despite steady government backing, sponge city initiatives have so far struggled to attract meaningful private sector participation. The reasons are familiar: unclear revenue streams, dependence on heavily indebted local governments, and the absence of mechanisms to share risk.[13]

Yet the private sector's hesitation also reflects a deeper market failure—businesses have not fully priced their own exposure to flooding. Even when companies recognize the risks, they often prefer to pay existing flood insurance premiums rather than commit to PPP projects, which require large upfront investment with uncertain, long-term returns. In the short run, insurance can seem cheaper and more predictable, even if it does little to reduce underlying vulnerability.

Wuhan's experience illustrates the limits of a purely government-led model. While its sponge city initiative was envisioned as a driver of economic growth, it instead added to the city's debt burden. Between 2015 and 2018, Wuhan raised RMB 16.3 billion to finance the construction of its demonstration zones, yet the central government's support amounted to only RMB 500 million per year.[14] Servicing this debt and funding ongoing maintenance consumed a significant portion of the city's budget and led to the accumulation of additional implicit liabilities.[15]

In general, sponge cities became a fiscal drag for many local governments. Recognizing these challenges, the Ministry of Finance revised and tightened its criteria for selecting new sponge city pilots in 2023.[16] It mandated that new applicant cities must demonstrate low debt risk, sufficient fiscal capacity to support sponge city investments, and strict safeguards against the creation of new implicit debts. This shift signaled Beijing's recognition that long-term sustainability will depend on leveraging private as well as diversified funding sources.

The sponge city program underscores the limits of government-led, debt-financed models that lack revenue streams or risk-sharing mechanisms to attract outside capital. Without the proper enabling conditions, adaptation initiatives may remain small-scale experiments rather than maturing into full markets. Scaling adaptation requires clear incentives, distributed risk and demonstrated economic value.

13 South China Morning Post (2024). Climate change: China's 'sponge cities' struggle to soak up flooding from severe storms despite billions in investment. https://www.scmp.com/business/article/3247405/climate-change-chinas-sponge-cities-struggle-soak-flooding-severe-storms-despite-billions-investment

14 Hanyang District People's Government of Wuhan. (2015). Business environment (营商环境). https://www.hanyang.gov.cn/ztdh/yshj/gzdt/

15 Low Carbon City Academy. (2020). Recommendations for easing financing challenges in sponge city construction from a green finance perspective (绿色金融视角下国内海绵城市建设投融资纾困建议). http://www.lowcarboncity.com.cn/School-View-id-2276.html

16 21st Century Business Herald (21财经). (2016). Sponge city financing difficulties: Subsidies cannot keep up with construction, PPP participation is difficult (海绵城市融资困境：补贴赶不上建设 PPP参与难). https://m.21jingji.com/article/20160706/eb96a91334aa4dbcb6997b608b12e888.html

Agricultural Drones: An Adaptive Solution for the Real Economy in Rural Areas

Adaptation innovation materializes as real-world products and services that meet the demands of a hotter, more volatile climate. In China, this can be seen in technologies as varied as advanced HVAC systems for cooling[17] or, more strikingly, agricultural drones that help farmers adapt to shifting weather patterns and resource constraints.

Drones provide a strong example of how state support, private innovation and market demand can converge to create scalable adaptation tools. The agricultural drone sector has benefited from piggybacking off mitigation and rural revitalization efforts, demonstrating that adaptation industries can scale when linked to existent industrial and market policies.

In China, farmers are increasingly deploying drones to monitor crops, manage harvests and respond to extreme weather, yielding measurable improvements in efficiency and productivity. Deployment is driven by real demand, underpinned by technology, and gradually becoming less reliant on government subsidies.

In 2024, China had 251,000 agricultural drones in use, tasked with agricultural protection, flood monitoring and management, forest fire prevention, and wellness checks on elderly rural residents.[18] As the drone company DJI put it, farmers are using drones "to improve crop scouting efficiency, reduce chemical usage, and boost yield." [19]

MSOEN, a China-based drone manufacturer, highlights how its products address climate-driven extreme weather, positioning itself as a pioneer in the "future of adaptive agriculture." [20] The company notes that "climate-resilient drones exemplify how technology can turn agricultural vulnerability into strength," reducing farmers' exposure to climate risks. Features like precision water spraying help to conserve resources while protecting crops, demonstrating drones' explicitly adaptation-oriented qualities. MSOEN now aims to expand internationally, explaining that "by merging real-time data, adaptive engineering and policy foresight, these drones offer a scalable blueprint for nations battling climate change."

17 Paulson Institute. (2021). 2021 Winner (Green Innovation): Innovating HVAC System and Investment Pattern to Boost Energy Efficiency Project. https://www.paulsoninstitute.org/events/2021-winner-green-innovation-global-cooling-innovating-hvac-system-and-investment-pattern-to-boost-energy-efficiency-project-guangzhou-guangdong

18 World Internet Conference (世界互联网大会). (2025). China's low-altitude economy boosts smart agriculture, rural development. https://wicinternet.org/2025-03/07/c_1076118.htm

19 DJI Agriculture. (2022). Agriculture drone case study: Cotton. https://ag.dji.com/case-studies/dji-ag-case-en-cotton2

20 Msoen. (2025). Climate-Resilient Farming: How China Agricultural Drones Combat Extreme Weather and Secure Harvests. https://msoen.com/climate-resilient-farming-how-china-agricultural-drones-combat-extreme-weather-and-secure-harvests

Government incentives have played a crucial role in enabling this market. Local authorities, such as in Yunnan Province, have subsidized agricultural drone purchases, while central policies encourage upgrades and the replacement of older equipment.[21] Companies like XAG leveraged these subsidies along with private investment—RMB 1.2 billion in Series C funding from SoftBank and Baidu—to cut costs, expand service areas, and scale operations.[22] As costs decline and adoption grows, policy support is expected to gradually shift toward market-driven operations, following a pathway already seen in China's renewable energy sector, where early reliance on subsidies eventually gave way to commercially viable markets.

At the central level, the National Development and Reform Commission (NDRC) has created broader mechanisms to catalyze private investment in high-tech, adaptation-relevant sectors. The 2025 Government Venture Capital Guidance Fund, for example, pairs government capital with market-driven financing to support emerging technologies, including agricultural drones.[23]

While drones demonstrate the potential of market-driven adaptation solutions, and sponge cities illustrate the power and limits of government-led initiatives, scaling these interventions nationally requires robust financing mechanisms often combined with a supporting regulatory incentive to encourage adoption. Early subsidies, pilot programs and local government support can jump-start adoption. But long-term impact depends on private capital, risk-sharing tools and policy frameworks that make adaptation economically viable. The following section examines how China is developing central-level mechanisms such as green bonds,[24] catastrophe insurance and venture capital guidance to channel investment into adaptation markets, enabling promising pilots to expand into fully functioning, scalable solutions.

21 Global Times. (2025). From plowshares to propellers: how Chinese farmers are piloting agricultural modernization. https://www.globaltimes.cn/page/202503/1330357.shtml

22 South China Morning Post. (2020). Agricultural drone maker XAG raises US$182 million in funding round led by Baidu, SoftBank. https://www.scmp.com/tech/big-tech/article/3110035/agricultural-drone-maker-xag-raises-us182-million-funding-round-led

23 Xinhua. (2025). NDRC director: National venture capital guidance fund will be established (国家发展改革委主任：将设立国家创业投资引导基金). https://news.cn/politics/20250306/85624c65cf7e402e90f7c463f661d464/c.html

24 China Internet Information Center (CIIC) (2025). The Ministry of Finance released the "Green Sovereign Bond Framework of the People's Republic of China" (财政部發佈《中華人民共和國綠色主權債券框架》).http://big5.china.com.cn/gate/big5/zw.china.com.cn/2025-02/21/content_117725255.shtml

Catalyzing Adaptation Markets: Central-Level Policy and Private Capital

Early efforts to involve private sector actors through limited public–private partnerships (PPPs) revealed a stubborn reliance on state-owned platform companies rather than true private capital, with adaptation-oriented projects facing even greater hurdles. Their benefits often take the form of avoided losses or improved resilience rather than direct revenues, making cash flows difficult to define. As a result, many PPPs simply shifted debt off the balance sheets while creating hidden liabilities. Investors were deterred by unclear revenue models and local governments' reluctance to share control. These lessons underscored that adaptation markets cannot scale without risk-sharing, visible returns and credible policy frameworks.[25]

Insurance has emerged as one of the clearest entry points. By the end of 2024, Chinese insurers managed US$4.6 trillion in assets, with green investments nearing 10 percent. Regulators are pushing a dual "investment and protection" model: agricultural catastrophe premiums are subsidized up to 80 percent.[26] Smaller-scale models are also appearing.

For example, in 2024 the Ningbo Meteorological Bureau and Xiangshan Rural Credit Cooperative launched a "climate loan + insurance" package to help a yellow-croaker farmer upgrade aquaculture facilities against typhoons and heatwaves.[27]

Bond markets have provided another pathway for adaptation finance. More than 80 percent of Chinese green bonds enjoy cost advantages, with an average yield spread benefit of 6.74 basis points.[28] Ji'an Urban Investment in Jiangxi issued a RMB 3 billion green corporate bond in 2024, allocating RMB 860 million to flood control and drainage. The bond received a "Dark Green" rating (signifying the highest environmental performance) and saved 35 basis points in coupon payments compared to similar conventional bonds.[29]

Sustainability-linked bonds are pushing further by tying financing directly to resilience outcomes. For example, China Industrial Bank's RMB 20 billion

25 Qin S., et. al. (2024). Spatial diffusion of public-private partnership (PPP) in China: A county-level analysis. https://www.sciencedirect.com/science/article/abs/pii/S0264275124000313

26 Government of China (2021). The central and local governments will implement premium subsidies for farmers who participate in two types of agricultural insurance (中央地方财政对两类农业保险投保农户实施保费补贴). https://www.gov.cn/zhengce/2021-07/07/content_5622922.htm

27 Ningbo Daily Newspaper Group (宁波日报报业集团) (2024). The city's first "climate loan + insurance" program was launched (全市首例 "气候贷+保险"落地). http://epaper.cnnb.com.cn/nbwb/pc/content/202407/18/content_164583.html

28 The Securities Times (证券时报; 證券時報) (2024). The latest move is to layout this type of product! (最新出手，布局这类产品！). https://www.stcn.com/article/detail/1192470.html

29 Lianhe Green Development (联合绿色发展) (2024). Ji'an Urban Investment Holding Group Co., Ltd. Second-Party Opinion, Green Finance Framework (吉安城投控股集团有限公司第二方评估意见, 绿色金融框架).

issue required a 20 percent reduction in urban flooding within three years, with a 50-basis-point penalty spread if the target is missed.[30] Catastrophe bonds have also entered the mix, including the Greater Bay Area's first issuance in 2021 by China Property & Casualty Reinsurance Co., which transferred typhoon and rainfall risk to international capital markets and created a new domestic channel for catastrophe-risk diversification.[31]

Beyond market-based tools like green bonds and sustainability linked bonds, China's climate investment and financing pilots are an institutional mechanism to scale adaptation finance. By mid-2024, over 5,400 projects had been registered or reserved across pilot regions, with total planned investment exceeding RMB 3 trillion (US$420 billion). Banks had extended more than RMB 500 billion (US$70 billion) in credit, with local fiscal support helping to reduce project costs and improve bankability. Instruments like the People's Bank of China's (PBOC) Carbon Emissions Reduction Facility (CERF) have also played a catalytic role, channeling over RMB 1.1 trillion (US$150 billion) in low-cost lending toward decarbonization projects, contributing to nearly 200 million tons of annual CO_2 reduction.[32]

The Ministry of Ecology and Environment (MEE), National Development and Reform Commission (NDRC), and PBOC jointly oversee these pilots, with local governments screening projects, banks providing syndicated credit, and subsidies improving returns. The PBOC's green relending program lowers financing costs for projects listed in the Green and Low-Carbon Transition Industry Catalog, which in 2024 was updated to include sectors such as greenhouse gas control, low-carbon transitions in key industrial sectors, and R&D of green emerging technologies and products.[33] In February 2025, the National Financial Regulatory Administration (NFRA) and PBOC issued a plan to expand green finance in banking and insurance, easing restrictions on insurers' climate-related investments and channeling funds into patient capital for adaptation.[34] Regulators are also allowing adaptation infrastructure such as rainwater reservoirs, clean energy projects, and heat-resistant pipelines to qualify as underlying assets for public REITs, enabling "maintenance cost savings" to be recognized in cash flow models.[35]

By reducing risk, clarifying revenue models, and strategically deploying state support, China is using pilot projects as test beds for adaptation finance. When these pilots succeed, they are gradually scaled up; when they fail, they are set aside. This trial-and-error approach is creating the conditions for private capital to flow into adaptation at scale. The next step, however, is to embed the lessons from these pilots into the national green finance framework, otherwise they risk remaining fragmented experiments rather than shaping systemic solutions.

30 Sina Finance (新浪财经) (2024). Industrial Bank Successfully Issues 20 Billion Yuan of 2025 Second Green Financial Bonds with a Coupon Rate of 1.66 percent (兴业银行成功发行200亿元2025年第二期绿色金融债券，票面利率1.66 percent). https://finance.sina.com.cn/cj/2025-06-20/doc-infarssy6946116.shtml

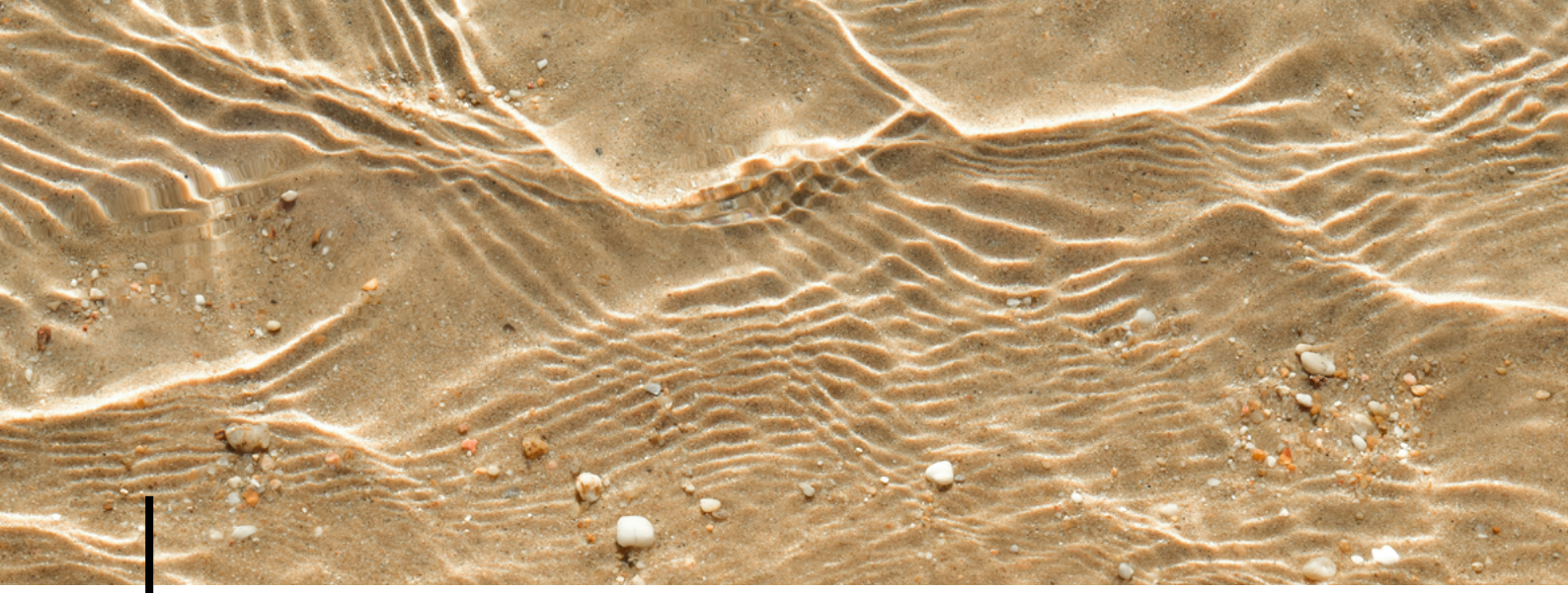
31 Aon Media Room (2021). Pioneering Hong Kong Catastrophe Bond Structured by Aon Highlights Regional Importance of Alternative Capital. https://aon.mediaroom.com/news-releases?item=138124

32 People's Daily Online (人民网). Empowering New Quality Productive Forces through Climate Investment and Financing (以气候投融资赋能新质生产力). https://cj.sina.com.cn/articles/view/5953740931/162dee08306701qj8m?froms=ggmp

33 People's Daily Overseas Edition (人民日报海外版) (2024). The "Green and Low-Carbon Transformation Industry Guidance Catalogue (2024 Edition)" was released to guide industries towards green development (《绿色低碳转型产业指导目录（2024年版）》发布——引导产业迈向绿色发展). https://www.gov.cn/zhengce/202403/content_6935934.htm

34 Griffith Asia Institute (GAI) (2025). China green finance status and trends 2024-2025. https://greenfdc.org/wp-content/uploads/2025/03/Yue-and-Nedopil-2025_China-green-finance-status-and-trends-2024-2025-final.pdf

35 China Securities Regulatory Commission (中国证券监督管理委员会) (2025). Public REITs Achieve a "Transformation" in Four Years From Zero to 200 Billion RMB (公募REITs四年"蝶变"从0迈向2000亿元). http://www.csrc.gov.cn/shanxi/c106408/c7565883/content.shtml



The Extent of Adaptation Market Formation in China

Through national strategies, green and nature finance reforms, and pilot programs, Beijing has begun to establish the policy, regulatory and financial frameworks needed to support the development of adaptation markets. Certain sectors, such as agricultural drones, catastrophe insurance and green bonds tied to adaptation-related assets, are beginning to take shape, yet they remain small relative to the scale of the country's adaptation needs. For the foreseeable future, the bulk of adaptation investment continues to originate from state-led initiatives.

While the government cannot directly make adaptation profitable, it can reduce risks, signal national priorities, and create the financial architecture that private actors require to engage. In this context, regulators, policymakers and development banks are experimenting with innovative instruments—catastrophe bonds, sustainability-linked bonds, insurance-based products, and green relending mechanisms—that lay the groundwork for private participation.

For example, in September 2025, a local branch of China Construction Bank in Hubei issued what it claims to be the country's first "Climate Adaptation Loan", a RMB 290,000 credit to a tea cooperative, using the cooperative's climate resilience (such as disaster preparedness and drought resistance) as a new basis for creditworthiness.[36] The loan factors into how well the borrower can adapt to climate impacts, effectively turning adaptation capacity into a form of collateral for finance. These tools do not automatically generate large-scale investment, but they do provide the institutional scaffolding necessary for adaptation markets to develop over time.

On the market side, private investment in adaptation remains limited relative to mitigation finance and overall needs. Part of the challenge is that adaptation is still a relatively new concept, with a limited pipeline of investable projects. As a result, many large-scale interventions still rely heavily on government budgets and face challenges attracting private capital due to unclear revenue models, high upfront costs and gaps in risk-sharing. Where adaptation markets are gaining traction is in areas with clearer business cases and immediate demand. Agricultural drones, resilient cooling technologies, and catastrophe insurance illustrate how commercial viability can emerge, particularly when early-stage subsidies help mitigate risk.

China's adaptation markets are nascent but expanding. The critical test will be whether the forthcoming 15th Five-Year Plan,

36 China Meteorological Administration, "Climate Loan" activates financial value of climate resources, (崇阳："气候贷"激活气候资源金融价值). https://www.cma.gov.cn/ztbd/2025zt/20250418/2025041805/jcdt/202509/t20250908_7319582.html

alongside parallel financial and regulatory reforms, will prioritize adaptation, sending signals that the government supports the move towards a self-sustaining adaptation economy.

China's early-stage adaptation markets, while limited in scale, provide valuable insights into the conditions necessary for building a functioning adaptation economy. The country's experience underscores that risk-reducing instruments and strategic subsidies are essential to catalyze private participation. At the same time, market viability requires clear business models and demand-driven solutions. The opportunity lies in translating China's pilot initiatives into robust, self-sustaining markets capable of mobilizing private capital at the scale required to meet the country's, and the world's, growing adaptation needs.

Conclusion: Toward an Adaptation Economy in China

China's centralized governance gives it unusual capacity to roll out policies nationwide at speed with a long-term focus, and coordinated with other mechanisms to support adoptions. such as subsidies and institutional support. This model has underpinned some advances in climate and biodiversity finance, from electric vehicles and solar energy deployment to standardized green taxonomies and the inclusion of climate metrics in performance evaluations.

Adaptation, however, presents a different challenge. Unlike renewable energy, which can be developed as a relatively self-contained sector, adaptation touches every part of the economy, from agriculture and infrastructure to finance, health and technology. Many adaptation measures overlap with mitigation and biodiversity, but adaptation goes beyond these in that it requires policies and interventions that properly price climate risk, enable viable revenue models, and foster the entrepreneurship needed to innovate solutions. Because adaptation often entails

trade-offs with near-term growth and still lacks mature markets, progress has been slower to take root compared with other parts of China's green agenda.

One important vehicle for experimentation has been China's green finance pilot zones established since 2017 across six provinces (Zhejiang, Jiangxi, Guangdong, Guizhou, Gansu and Xinjiang).[37] These zones serve as laboratories for credit, insurance, bonds and disclosure, and they demonstrate how policy support can accelerate innovation. In Zhejiang's Huzhou prefecture, a municipal-level, biodiversity-focused pilot program was launched featuring its own green taxonomy and local financial products with strong political backing and cross-sector collaboration, offering a model that could evolve into the adaptation economy.[38]

Evidence shows such pilots improve sustainable outcomes, especially in less-developed regions.[39] However, adaptation finance is likely to flow disproportionately to wealthy coastal cities, leaving inland regions (where drought and water scarcity dominate) underfunded.

Green bonds themselves illustrate the potential pathway from pilot to mainstream. Since the first guidelines in 2015, China's green bond market expanded to nearly US$556 billion in cumulative issuance by 2024.[40] Tested in pilot zones, refined through regulatory adjustments, and broadened in scope, these frameworks now support both domestic and international issuance, including China's first global green sovereign bond in April 2025, valued at RMB 6 billion (US$825 million), with proceeds directed toward mitigation, adaptation and biodiversity.[41] This progression suggests how adaptation finance could evolve: experimentation, piloting and scaling into robust national frameworks.

China's strategy has also emphasized adaptation technologies, with some notable successes. The country has sought to leapfrog established markets, as it did by bypassing the combustion engine to focus on EVs and by scaling renewables to build energy independence. President Xi has identified climate and biodiversity as growth priorities, signaling that adaptation entrepreneurs may also have opportunities to commercialize technologies at scale, whether agricultural drones, resilient cooling systems or water-efficient infrastructure.[42]

Like many countries, one challenge China faces is that despite good intent by policymakers, enforcement is difficult. Working out the inevitable bureaucratic complexities will be important to ensure the consistent and coordinated implementation of policy, especially since adaptation cuts across so many different ministries.

At the same time, China has recognized a competitive advantage in certain climate solutions and has actively pursued overseas markets. China's sizable foreign direct investment into green manufacturing abroad, which has surpassed US$227 billion in 54 countries since 2022, highlights

37 China Briefing. (2022). China's Green Finance Market: Policies, Incentives, Investment Opportunities. https://www.china-briefing.com/doing-business-guide/china/sector-insights/china-s-green-finance-market-policies-incentives-investment-opportunities

38 CFA Institute (2024). Green and Transition Finance on the Municipal Level: Case of Huzhou City. https://rpc.cfainstitute.org/sites/default/files/-/media/documents/article/industry-research/nzg-green-and-transition-finance.pdf

39 Lin G. et al., Frontiers in Ecology and Evolution. (2023). Revisiting the linkage between green finance and China's sustainable development: evidence from the pilot zones for green finance reform innovations.https://www.frontiersin.org/journals/ecology-and-evolution/articles/10.3389/fevo.2023.1264434/full

40 Climate Bonds Initiative. (2025). China Sustainable Debt State of the Market Report 2024. https://www.climatebonds.net/data-insights/publications/china-sustainable-debt-state-market-report-2024

41 Reuters. (2025). China to sell first global green sovereign bond on Wednesday. https://www.reuters.com/sustainability/sustainable-finance-reporting/chinas-sell-first-global-green-sovereign-bond-wednesday-2025-04-01

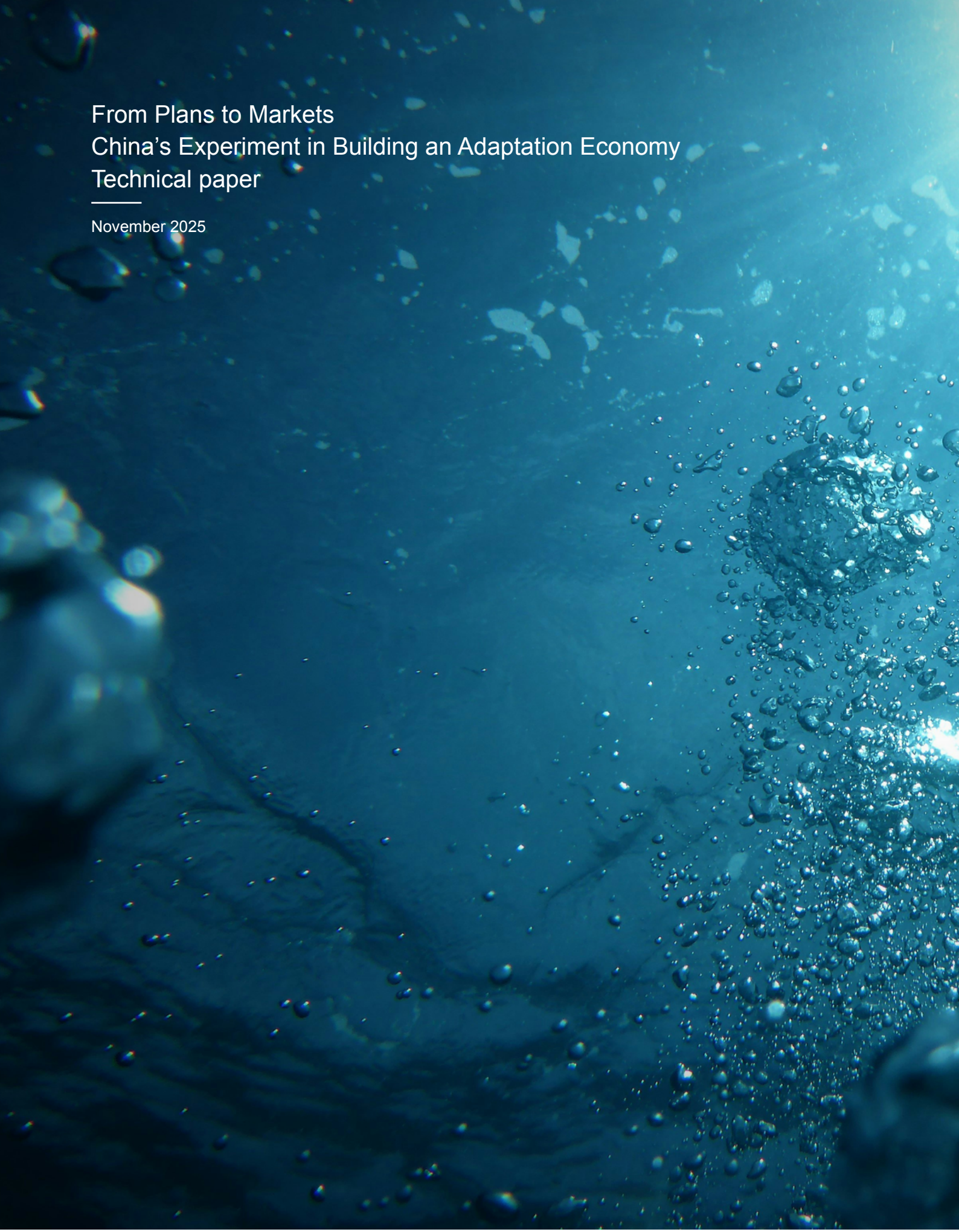
42 Xinhua (2023). Seeking harmony with nature, Xi steers China's green transition. https://english.www.gov.cn/news/202308/16/content_WS64dc0655c6d0868f4e8de947.html

China's pursuit of climate technologies not only to meet domestic goals, but also for profit overseas.[43] Whether a similar trajectory will emerge in adaptation technologies remains uncertain, as no clear domestic leaders have yet stood out.

Ultimately, political commitment at the highest level will determine whether adaptation follows a trajectory similar to that of climate mitigation. China has made notable progress in developing policies on climate and biodiversity, yet it still has a long way to go before these efforts can be considered successful. As with its rapid mobilization on air pollution when public outcry reached crisis levels, adaptation progress may accelerate only as climate risks to food security, water supplies and urban systems intensify.

As the world's largest emitter, whether China manages to build a functional adaptation economy has major stakes for climate resilience within its borders and beyond. While China's unique system means it may not serve as a direct model for other countries, such efforts could nonetheless create competitive advantages in climate-related industries.

43 Net Zero Industrial Policy Lab (2025). China's Green Leap Outward: The rapid scale- up of overseas Chinese clean-tech manufacturing investments. https://www.netzeropolicylab.com/china-green-leap



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